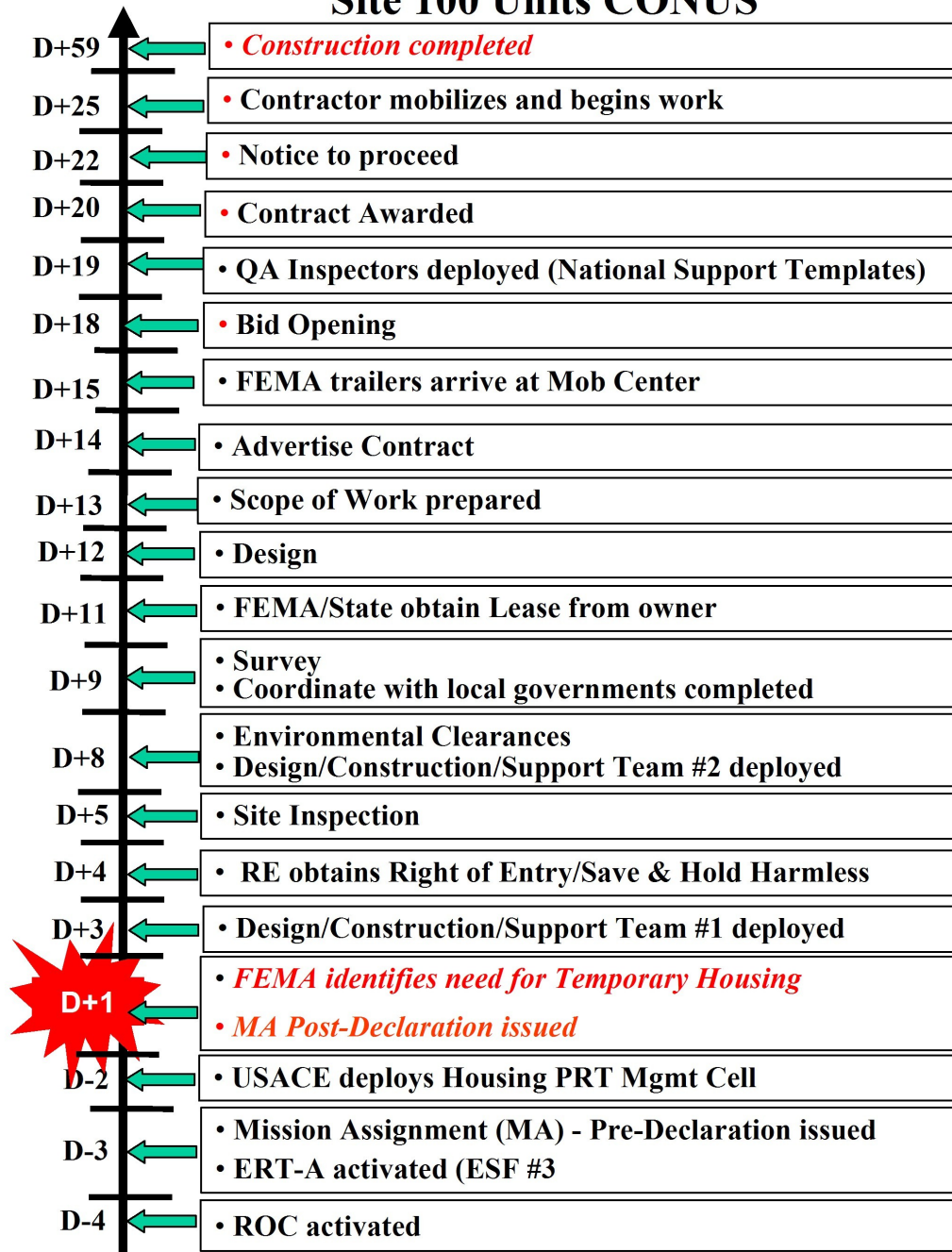


Site Design

Brian Collins, PE

US Army Corps of Engineers – Huntington
District

Housing Mission Execution Timeline New Site 100 Units CONUS



Preliminary Assessments

- Availability of Utilities
 - Topography
 - Location (proximity to “Normal Life”)
 - Out of 100 yr Floodplain????
 - Capacity (6 to 8 MH per acre, 10-12 TR per acre)
-

Site Criteria

- ❑ Above 100 year flood elevation
 - ❑ No filling of flood plain – LOMR issue (3 weeks)
 - ❑ Flat Ground
 - ❑ Landowner willing to participate
 - ❑ Environmental Assessment
 - ❑ Distance to schools, hospitals, shopping
 - ❑ Access road
 - ❑ Utilities – water, sewage, electric, phone
-

2. Attachment**Essential Elements of Information**

Site Name: _____ Site ID: _____ Date: _____ Time: _____
 Owner(s): _____ Phone: _____
 Address: _____
 Owner interested: _____
 Latitude: _____ Longitude: _____
 Acres: _____ Pads: _____

Utilities

Electric Y/N
 Sewer Y/N
 Gas Y/N
 Water Y/N
 Phones Y/N

Miles to Nearest:

Elementary _____
 Hospital _____
 High School _____
 Fire Hydrant _____

Other:

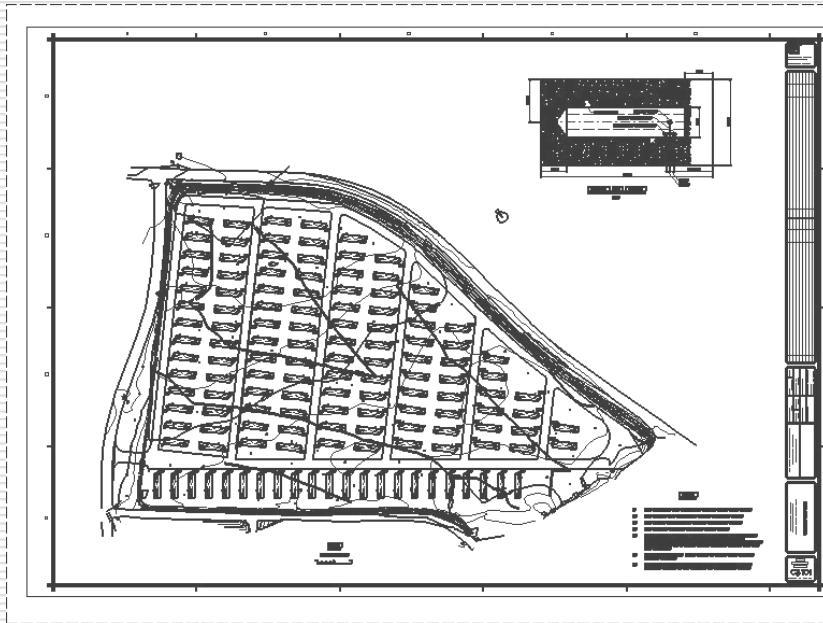
Wetlands Y/N
 Access Bridge /N
 Waterline _____
 Sewer Line _____

Notes: _____

Property availability: _____
 Fill Concerns? _____
 Good Road Access? _____
 Interested in developing it as a Trailer Park? _____
Sketch:

Miles to Wal-Mart?

Using CADD/GIS to your advantage



- ❑ Preliminary “Floating” Surveys
- ❑ Pull points in with InRoads
- ❑ Determine number of units that site may facilitate.
- ❑ Tie down to State Plane Coordinates if Site Determined Feasible by FEMA
- ❑ GIS “eye candy” for FEMA at JFO

Before You Leave!!!!

- Have CADD/GIS software READY TO USE in the field
 - Ensure georeferenced graphics (for Area of Operations) are PRE-INSTALLED on laptop
 - Ensure plotting capabilities are available.
 - Have sound communication lines to relay information to JFO.
-

Parks Manor



Issues:

- Site had been filled
- Required 100 year flood analysis
- Required **Letter of Map Revision**

Meanwhile.....

- ❑ Compile List / Develop Contacts for local municipalities (sewer, water, power, cable, phone). Obtain all available plans for existing water and sewer. Digitize these if possible in State Plane coordinate system.
 - ❑ Determine processes and responsibilities of obtaining various permits for sewer, water, NPDES, FONSI, etc...
 - ❑ If package sewage treatment plant is required, start making plans to have it ordered
 - ❑ Obtain FEMA's directive of housing unit types (MH park or Expedited Group (EG) site).
 - ❑ Provide Preliminary Cost Estimates to FEMA. This is usually \$18,000 to \$25,000 per trailer pad.
-

Expedited Group Site



General Site Considerations

- **Grade Site to Ensure Positive Drainage**
 - 1. Use InRoads to develop design surfaces in .dtm formats.
 - 2. Ditching may be required
 - **Gravel Entire Site with Separation/Reinforcement Fabric underlying Gravel**
 - **Pave Roads with Asphalt Wearing Course (coordinate with FEMA)**
 - 1. InRoads may be used to develop these quantities as well.
 - **Dumpster Pad Locations**
 - **Mailbox Clusters**
 - **Bus Stop Shelters**
 - **Spacing of Units in Accordance with Local Fire Codes**
 - **Parking Blocks**
 - **Lot Numbering with Input from Local Postmaster and Fire/Ambulance Services**
 - **Utility “alleys” between back end of Trailer Rows**
 - **Leave Plenty of Stub up for utilities to accommodate various unit types**
 - **EROSION CONTROL**
-

Special Considerations

- Who purchases trailers
 - Storm retention structures
 - Pad size (asphalt, concrete, gravel)
 - Lot size (waiver)
 - Streets (paved or gravel, signage)
 - Telephone (required? who installs cabling)
-

Special Considerations Con't

- ❑ Solid waste (central collection)
 - ❑ Sewage (storage tanks, sewer line size & condition)
 - ❑ Electric meters (individual or group)
 - ❑ Electrical (inspection, certifications, power lines)
 - ❑ Street lights (utility or government installed)
 - ❑ Mail Boxes
-

Special Considerations Con't

- ❑ Water (connection to mains, size of main)
 - ❑ Water meters (individual or group)
 - ❑ Fire Suppression (connector size)
 - ❑ Wash houses (washers and dryers)
 - ❑ Gas (type, certification, connection to mains, deposits)
 - ❑ Cable TV (required, who installs cable)
-

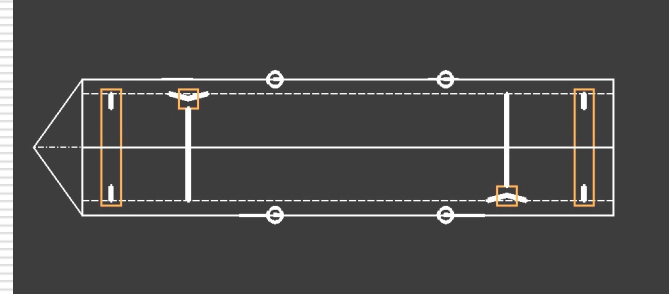
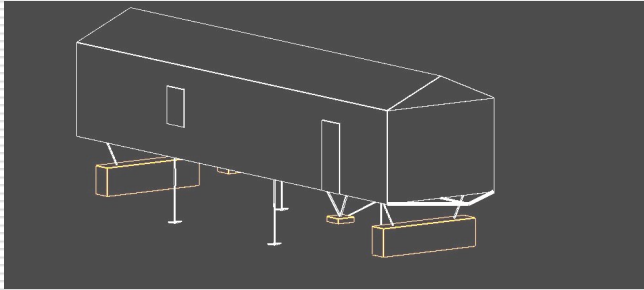
Special Considerations Con't

- ❑ Special Needs requirements (street crossings, ramps).
 - ❑ Fencing (separate on-going construction, major roads & streets).
 - ❑ Reach an early agreement with FEMA on credits placed on signs at group sites.
 - ❑ Compaction of trenches.
-

Preparation of Site with Gravel



Layout of Trailer Pads



- ❑ Location of Utilities
 - ❑ Maximization of Available Space
 - ❑ Accessible Unit Lots
 - ❑ Shower Units
 - ❑ Laundry Units
 - ❑ Leave Enough Room for Deactivation
-

Group Site Design

Utilities

- ❑ Sewer – Brian Collins and Captain Carl
 - ❑ Water – Brian Collins
 - ❑ Power – Jeff Jezewski
-

**Temporary Housing
Planning Response Team (PRT)**

Utility Design Checklist

Site Name: # 7	Site Location: Somewhere Site	Date: 9-11-98
Projected # of Units: 200	Anywhere USA	

Utility	Company/POC Name	Phone Number	Fax	E-Mail
Water				
Wastewater				
Electrical				
Telephone				
Cable TV				
Gas				
(City)				

✓	Item	Responsibility		
		COE/ Contractor	City	Utility Company
	<u>WATER</u>			
	Plumbing Code Requirements Identified			
	Waivers ☐ Required ☐ Obtained			
	Existing Water Lines Located			
	Available Main(s) Size			
	Material			
	Pressure			
	Flow			
	Water Storage Necessary? ☐ Yes ☐ No			
	Type of Metering			
	☐ None			
	☐ Master for Site			
	☐ Individual Unit			
	Meters Purchased From:			
	☐ Water Authority			
	☐ Supplier			
	Water Main Tap In Connection Responsibility:			
	Tap in Fee? ☐ Yes ☐ No			

✓	Item	Responsibility		
		COE/ Contractor	City	Utility Company
	Local Health Authority Approval? ☐ Yes ☐ No			
	POC: Phone:			
	<u>Fire Protection Considerations</u>			
	Fire Protection Needs Coordinated? ☐ Yes ☐ No			
	POC: Phone:			
	Fire Protection Standard Used: ☐ NFPA #501A ☐ Local			
	Other Fire Protections Requirements Identified?			
	Hydrant Requirements			
	Maximum Distance Between Hydrants			
	Connection Sizes			
	Thread Size			
	Available Pressure and Volume Adequate to meet Fire Needs?			
	☐ Yes ☐ No			
	<u>WASTEWATER</u>			
	Plumbing Code Requirements Identified?			
	Waivers ☐ Required ☐ Obtained			
	Existing Sewer Lines Located			
	Available Collector(s) Size			
	Material			
	Capacity			
	Lift Station(s) Necessary? ☐ Yes ☐ No			
	Holding Tank Necessary ☐ Yes ☐ No			
	On-site Treatment Necessary? ☐ Yes ☐ No			
	Approving Authorities:			
	Agency: POC:			
	Phone:			
	Approval Secured in Writing? ☐ Yes ☐ No			
	Other Permits Required for Treatment Facility (define):			
	Physical Sewer Tap-In Responsibility:			
	Tap in Fee? ☐ Yes ☐ No			
	Local Health Authority Approval? ☐ Yes ☐ No			
	POC: Phone:			

✓	Item	Responsibility		
		COE/ Contractor	City	Utility Company
	<u>ELECTRICAL</u>			
	Applicable Electrical Code Identified			
	Code ☐ National ☐ Local			
	Certified Electrical Inspections Required? ☐ Yes ☐ No			
	Type of Electrical Service ☐ Overhead ☐ Underground			
	Service for Package Sewer Plant Required? ☐ Yes ☐ No			
	Service for Lift Station Required? ☐ Yes ☐ No			
	Available: ☐ Single-Phase ☐ Three-Phase			
	Local Electrical to Provide Electrical Design for Corps Site Plan.			
	☐ Primary Line Locations			
	☐ Secondary Service Locations			
	☐ Transformer Locations			
	☐ Street Light Locations			
	Street Lighting Unit Selected			
	Individual Site Meter Posts			
	Coordination of Electrical with Utility Excavator			
	<u>TELEPHONE</u>			
	Type of Telephone Service ☐ Overhead ☐ Underground			
	Telephone Line Placement Coordinated with Power Company			
	<u>CABLE TV</u>			
	Cable TV Distribution to be Provided? ☐ Yes ☐ No			
	<i>The local cable TV company should be advised on the need for coordination of cable installations when the utility trench is open.</i>			
	<u>GAS</u>			
	Gas Service Required for Site? ☐ Yes ☐ No			
	Type of Service: ☐ Natural Gas ☐ Bottled LP			
	Existing Gas Mains Located			
	Available Main(s) Size			
	Material			
	Gas Meter Specifications Identified? ☐ Yes ☐ No			
	Gas Line Tap In Connection Responsibility:			
	☐ Local Gas Co ☐ Corps Contractor			
	Tap in Fee? ☐ Yes ☐ No			
	Local LP Supplier(s) Identified and Contacted			

Appendix E – PRT Operational Forms/Checklists

✓	Item	Responsibility		
		COE/ Contractor	City	Utility Company
	<u>SOLID WASTE</u>			
	Type of Collection to be Provided for Mobile Home Sites			
	☐ None			
	☐ Centrally Located Dumpsters			
	☐ Individual Pickup at Each Residence			
	Pad Requirements for Central Dumpster Sites			
	Number of Separate Dumpster Sites			
	☐ Graveled Pad			
	☐ Asphalt Pad			
	☐ Concrete Pad			
	☐ Fenced Enclosure Required. Type:			
	Temporary Onsite Storage Required? ☐ Yes ☐ No			

Sanitary Sewer Design



Sanitary Sewer Design

- ❑ Package Plant v. Municipal Tie In
 - ❑ Use State Standards
 - ◆ Minimum Slope Allowances
 - ❑ Estimating Peak Flows
 - ◆ 200 - 250 gpd per unit (MH's)
 - ◆ 100 - 125 gpd per unit (TT's)
 - ❑ Sizing Lines
 - ◆ Use Mannings Equation
 - ◆ Oversized Lines/Junction Boxes for Additional Storage
 - ❑ Horizontal Design
 - ❑ Vertical Design using InRoads
-

Design Example – Sewage Laterals



- ❑ Each Lateral Serves two units
- ❑ Main part of “T” shaped lateral is 6” PVC
- ❑ Branch Pipes to Trailers are 4” PVC
- ❑ A 6” Cleanout is left at the intersection to provide a maintenance entrance.
- ❑ This scenario serves two trailers, and alternates lots with a similar “two unit” water connection.

Package Treatment Plants “Captain Carl”



Package Treatment Plants

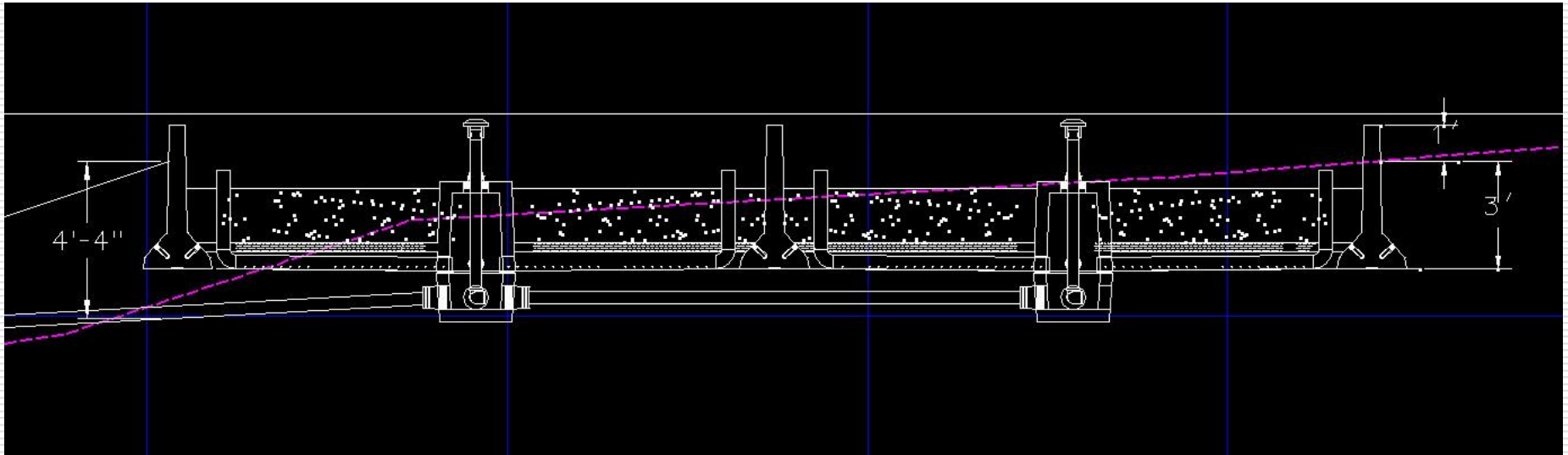


Package Treatment Plants



Package Treatment Plants

Sand Filter



Package Treatment Plants

Chlorination-Dechlorination Tank



Package Treatment Plants

Additional Information

- ❑ Must provide power drop.
 - ❑ Must provide water service for a hose bib and vacuum breaker.
 - ❑ Must pipe effluent to a flowing stream.
 - ❑ Coordinate with FEMA and State offices to have a maintenance plan in place after park is operational.
-

Water Distribution



Water Distribution



- ❑ Fire Hydrants and Fire Protection Flow
 - ❑ Distribution Line Sizes
 - (Hazen-Williams)
 - ❑ Distribution Loops to ensure Continuous Flow and Pressure
 - ❑ Metering
 - ❑ Encasement of Water Lines when crossing Sanitary Sewer.
 - ❑ Valves and appurtenances
-

Plan Format

- ❑ Cover Sheet
 - ❑ Index
 - ❑ Overall Site Plan
 - ❑ Survey Control Plan
 - ❑ Individual Site Plans
 - ❑ Cross Sections
 - ❑ Sanitary Sewer Plan
 - ❑ Sanitary Sewer Profiles
 - ❑ Water Distribution Plan
 - ❑ Power Distribution Plan
 - ❑ Details
 - ❑ Erosion Control/Environmental Protection
-

Printed Plans Coordination

- Plans and Specs
 - FEMA
 - State Regulatory Agencies
 - Local Regulatory Agencies
 - Landowner
 - Contractor
 - As-Built Drawings
 - FEMA
 - State
 - Corps
 - Landowner
-

Construction Phasing and Design

- ❑ Design with Phasing in Mind
 - ❑ Units may be leased in block by block, with contractor expanding park at the same time.
 - ❑ Safety is a concern, and temporary chainlink fencing should be used to separate construction areas from living areas.
 - ❑ FEMA will need to issue a “hold harmless” document for contractor’s insurance purposes.
-